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Does it work everywhere? Group Model Building as participative method in intercultural perspective.

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Group Model Building (GMB) is a type of facilitated model building, in which the input of the participants to structuring a complex problem is crucial. There is a high level of participant interaction and involvement. The method focuses on open communication between participants to gain insight in the complex problem and to foster consensus. Herewith the facilitators aim to create commitment to the results of the intervention and proposed leverages for change. However, GMB was developed in the Netherlands and the United States, and therefore also mainly implemented there. These countries are characterized by a small power distance and a large acceptance of participative ways of working. The question is whether the GMB method also works in contexts with a large power distance and where participative ways of working are less common. This paper aims to contribute to knowledge about the role of power distance as cultural context in the efficiency of GMB, by comparing the results of GMB interventions in various countries which differ in terms of national power distance. Our results show that the GMB effects on communication, learning and consensus are comparable in different cultural contexts. Participants from countries characterized by high power distance experience strongest contributions of the intervention to commitment.

Introduction

Group Model Building (GMB) is a method of facilitated system dynamic model building, in which stakeholders from different positions inside and outside an organization, collaborate in order to structure a complex problem and to foster group decision making on this problem (Vennix, 1996). Participation is strongly characterizing this method, which is mainly used for so called ‘messy problems’, complex dynamic problems about which the opinions of the stakeholders vary regarding nature, causes of and solutions to the problems. Circumstances in which miscommunication and conflict easily arise, just like a lack of support for the outcomes of group decision making. The method of GMB therefore not only aims to support stakeholders in increasing their insight in the complex problem, but also to strengthen process related outcomes involving quality of communication, consensus and commitment (Rouwette, 2011).

Previous studies on the results of GMB to a large extent used self reports, post evaluations of the participants (Akkermans & Vennix, 1997; Rouwette, 2011; Vennix, Schepers & Willems, 1993). Rouwette (2011) designed a questionnaire to study the effects of GMB on communication, consensus and commitment. Communication involves the quality of the discussion between different participants (Akkermans & Vennix, 1997, cited in Rouwette, 2011:881). Dimensions of communication are

amongst others the extent to which participants in GMB thought there was openness and equal exchange of ideas. Consensus concerns shared beliefs, and the extent to which participants indicate to have reached agreement regarding the content of the discussion. Finally, according to Rouwette (2011) commitment relates to the willingness to exert oneself on behalf of the team.

Research on GMB interventions in the Netherlands shows that GMB positively influences the experienced quality of communication, the consensus reached and the commitment of the participants to the outcomes of the intervention (Rouwette, Bleijenbergh & Vennix, 2014; Rouwette, 2011). Meta research compares the effects of GMB in various countries. Recently Scott, Cavana and Cameron (2016) published an overview of studies on GMB effects, published from 2001 to 2014. The authors follow up on an earlier review study by Rouwette et al. (2002) of GMB interventions between 1987 and 2001. They conclude that GMB especially leads to consensus and commitment (ibid. p.6). Furthermore, they claim that more research on the effects of GMB is necessary in the future, particularly on the effects in multiple cases and in applied environments, in which stakeholders consider their input to have significant influence within the organization. More research is also needed on the settings in which GMB can be effective. This paper aims to meet these needs and focuses on a particular setting, national culture, which could influence the effects of GMB. In the next section we begin by defining what we mean by mental model, individual model and group model, and summarize the various efforts in the literature to capture them. Next, we will further explain our focus on national culture.

Participatory working methods and power distance

Why is it relevant to study the effects of GMB from the perspective of national culture? We consider the national culture as a set of relatively stable values, beliefs and assumptions, which people acquire in their early childhood. Research shows that these affect the effectiveness of management practices (Newman & Nollen, 1996).

“National culture is a central organizing principle of employees’ understanding of work, their approach to it, and the way in which they expect to be treated. National culture implies that one way of acting or one set of outcomes is preferable to another. When management practices are inconsistent with these deeply held values, employees are likely to feel dissatisfied, distracted, uncomfortable, and uncommitted.” (Newman & Nollen, 1996:755).

Newman and Nollen (1996) show that congruence between national culture and management practices improves the performance of organizations. Their claim is based on the five dimensions of national culture proposed by Hofstede (1991): power distance, individualism versus collectivism, masculinity versus femininity, uncertainty avoidance and long term versus short term orientation. Power distance is the extent to which the less powerful members of institutions and organizations within a country expect and accept power to be divided unequally (Hofstede, Hofstede & Minkov, 2010). Newman and Nollen (1996) claim that in the Western countries the popular participatory management practices are effective, because these concerns countries characterized by a low power distance. In countries with high power distance employees from various organizational levels would not feel comfortable to work together face-to-face. They will also have an anxious and suspicious approach towards participatory management, as “participation is not consistent with the national culture” (ibid., p. 756). In countries with low power distance participatory methods are more established (Fagenson-Eland et al., 2004), better achievable and they are supported more naturally than in countries with high power distance (Hofstede et al., 2010).

The participatory character of GMB feeds the expectation that the cultural dimension of power distance affects the participants' experience of the method. However, so far no information on the results of GMB in various cultural contexts has been systematically collected. The two meta studies on the effects of GMB (Rouwette, 2002; Scott et al., 2016) do not specifically report the location of the interventions. Rouwette (2002) described to have collected the geographical data of the organizations included in his review, but did not publish them. Scott et al. (2016) do not report anything related to geographical location, countries or cultures of the cases they described. The affiliation of the authors who were cited, indicate it predominantly involves studies in Anglo-Saxon countries like the United States (Anderson & Richardson, 1997), Australia and New Zealand (Scott, Cavana & Cameron, 2014), besides a series of studies on the effects of GMB in the Netherlands (Fokkinga, Bleijenbergh & Vennix, 2009; McCardle-Keurentjes, Rouwette, Vennix et al., 2009; Van Nistelrooij, Rouwette, Verstijnen et al., 2012). This geographical concentration suggests that the effectiveness of GMB is mainly studied in a specific cultural context, in which power distance according to Hofstede's definition is relatively low.

In this study we therefore look at GMB interventions in seven countries which vary on the cultural dimension of power distance. The central research question of this study is whether there are differences in the GMB results reported by participants in countries characterized by low, middle and high power distance. Based on the theory on the role of power distance in the national culture and how this coheres with management practices, we expect that participants from high power distance countries, indicate that the intervention has contributed less to the improvement of open communication, learning, consensus and commitment, than participants from lower power distance countries. We will test the hypothesis that GMB corresponds less well with the values of participants in a national culture with high power distance.

Group Model Building cases

The seven cases in this study are part of the European FP7-funded research project EGERA (Effective Gender Equality in Research and the Academia). The study concerns qualitative GMB interventions aimed at gender equality in science that have been implemented at universities and research institutes in Belgium, Czech Republic, France, Germany, the Netherlands, Spain and Turkey¹. The authors of this paper, in varying combinations, formed the facilitation team in each of the interventions. All interventions made use of the same design and scripts: discussion of data over time, definition of the problem, nominal group technique, modeling, and identification of leverages for change (Vennix, 1996). Each intervention consisted of two sessions of four hours, with some time in between the sessions, varying from a couple of days to two weeks. Between sessions, participants received a workbook with the report of the first session and some questions to be answered in preparation to the second session. After the intervention, participants received the draft of the final report, in order to incorporate their reactions in the final version, that was to be distributed.

In all cases, the participants were employed by the university or the research institute that hosted the intervention. Our gatekeeper to the organization² identified all participants to be stakeholders. Participants were members of academic, supportive and administrative staff, often placed at

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□ In the Netherlands this was the scientific director of the research institute, in all other cases our gatekeeper was one of the researchers in the EGERA project.

management positions. Sometimes they were also representatives of women scientific staff. During every intervention a gender expert, always an employee of the organization itself, was present. The groups varied in size between 11 and 20 participants.

Table 1. Characteristics of participants to GMB cases

	<i>Belgium</i>	<i>Czech Republic</i>	<i>France</i>	<i>Germany</i>	<i>The Netherlands</i>	<i>Spain</i>	<i>Turkey</i>
N u m b e r o f participants	11	10	14	9	11	12	16
Organizational position of participants	Dean, HRM, policy advisor, full professor, phd student	Director, scientific team leader, policy advisor, phd student	Director, secretary general, associate professor, policy advisor, HRM, postdoc	Board member, full professor, head of department, policy officer, staff officer	Dean, chair, full professor, assistant professor, postdoc	Head of department, policy advisor, supportive staff, phd student	Dean, vice dean, president advisor, chair, full professor, associate professor
Genderbalance (m/f)	2/9	6/4	8/6	2/7	5/6	4/8	4/12
Language	Dutch (sometimes English)	English	English (sometimes French)	English (sometimes German)	Dutch (sometimes English)	English (sometimes Catalan)	English

Method

After every intervention a written questionnaire with closed questions (Rouwette, 2011) is deployed to measure to what extent the participants experienced that the GMB intervention in which they participated, contributed to communication, learning, consensus and commitment. This questionnaire³ has nineteen questions, measured in a five point Likert scale (from *strongly agree* to *strongly disagree*). The questions are divided in the scales *communication* (four items), *learning* (five items), *consensus* (four items) and *commitment* (four items). In addition, the questionnaire contains two items on the *efficiency* (*using modelling in approaching the problem is efficient*) and *general success* (*all in all I think these meetings were successful*) of the intervention. All in all, 50 of the 83 participants (60%) filled out the questionnaire: 6 in Belgium, 7 in Czech Republic, 8 in France, 6 in Germany, 8 in the Netherlands, 8 in Spain and 7 in Turkey).⁴

In this article we examine the role of power distance, by comparing the experiences of GMB intervention participants from countries with a low, middle and high power distance. The most recent Power Distance Index (PDI) (Hofstede et al., 2010) ranks 76 countries, and gives them an index between 11 en 104⁵. To give an idea most Eastern European countries have a high power distance, with indices of 70 or more, while the Scandinavian countries show the lowest power distance (index 18-33). For this study we grouped the seven cases into three clusters of power distance: low, middle and high. Germany and the Netherlands have relatively low power distance, with PDI's of respectively 35 and 38. Belgium, France and Turkey have a relatively high power distance, with PDI's of 65, 68 and 66 respectively. Czech Republic and Spain are about in the middle of these groups and are therefore defined as the middle power distance groups with PDI's of both 57.

In this study we compare the answers to the questionnaires of participants to the interventions in Germany and the Netherlands (low power distance) to those of participants from Czech Republic and Spain (middle power distance) and to participants from Belgium, France and Turkey (high power distance). These three groups vary a little in size: 14 participants in the group with low power distance, 15 in the group with middle power distance and 21 in the high power distance group.

Results

The Shapiro-Wilk test shows that the scores of the three groups on the four scales are normally distributed (see Table 2).

Table 2. Shapiro-Wilk Test of normality for three power distance groups

Scale	Power distance	Statistic	df	Sig.
<i>Communication</i>	<i>Low</i>	.971	14	.208
	<i>Middle</i>	.792	15	.359

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³The complete questionnaire can be requested with the first author.

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⁴Not all participants attended both sessions and a number of participants had to leave before the end of the session because of other obligations, and as a consequence did not fill out the questionnaire.

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⁵The index rises above 100 because new countries are added to the countries Hofstede originally used to make the index, and Hofstede et al. (2010) chose not to adapt the indexing.

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<i>Learning</i>	<i>High</i>	.956	21	.382
	<i>Low</i>	.896	14	.887
	<i>Middle</i>	.781	15	.003
<i>Consensus</i>	<i>High</i>	.961	21	.440
	<i>Low</i>	.926	14	.099
	<i>Middle</i>	.905	15	.002
<i>Commitment</i>	<i>High</i>	.954	21	.532
	<i>Low</i>	.918	14	.267
	<i>Middle</i>	.938	15	.113
	<i>High</i>	.953	21	.398

A score of 3 represents a neutral evaluation by the participant of the intervention's contribution to communication, learning, consensus and commitment. A score below 3 means that according to the participant the intervention has a positive contribution. For the four scales the average scores are calculated for the groups of participants characterized by low, middle and high power distance (see Table 3). For each scale the averages differ significantly from neutral (two tailed t-test $p < .000$). As the average scores are all lower than neutral, this means that participants both from low, middle and high power distance countries, indicate that the GMB intervention positively contributed to the creation of communication, learning, consensus and commitment.

Table 3. Average GMB effect scores for three power distance groups and T-test results

Scale	Power distance	N	Mean	Standard deviation	F
<i>Communication</i>	<i>Low</i>	14	1.86	0.41	0.76
	<i>Middle</i>	15	2.12	0.65	
	<i>High</i>	21	2.00	0.59	
<i>Learning</i>	<i>Low</i>	14	1.84	0.42	0.55
	<i>Middle</i>	15	1.94	0.69	
	<i>High</i>	21	2.03	0.43	
<i>Consensus</i>	<i>Low</i>	14	1.68	0.49	1.64
	<i>Middle</i>	15	1.98	0.67	
	<i>High</i>	21	1.73	0.35	
<i>Commitment</i>	<i>Low</i>	14	1.96	0.47	3.28*
	<i>Middle</i>	15	2.31	0.63	
	<i>High</i>	21	1.87	0.46	

* $p = .047$

An one-way analysis of variance shows no significant differences between the three groups for three of the four GMB results: communication, learning and consensus ($p > .05$). The groups differ significantly on the fourth scale, the one representing commitment ($F(2,47) = 3.28$; $p = .047$). Participants from countries with high power distance indicate to have experienced the most commitment ($M = 1.87$; $SD = 0.46$), followed by participants from the low power distance countries ($M = 1.96$; $SD = 0.47$). The intervention is experienced to have contributed to commitment the least according to the participants from the middle power distance countries ($M = 2.31$; $SD = 0.63$).

The central topic of the interventions in all seven cases was gender equality in academia and characteristic for all cases was a strong underrepresentation of women in higher academic and management positions. Considering the central role of gender during the interventions, we will analyze whether there are gender differences in the experience of the GMB method.

Table 4. Shapiro-Wilk Test of normality for two gender groups

Scale	Gender	Statistic	df	Sig.
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<i>Communication</i>	<i>Men</i>	.942	15	.409
	<i>Women</i>	.925	35	.020
<i>Learning</i>	<i>Men</i>	.931	15	.282
	<i>Women</i>	.878	35	.001
<i>Consensus</i>	<i>Men</i>	.908	15	.126
	<i>Women</i>	.829	35	.000
<i>Commitment</i>	<i>Men</i>	.959	15	.670
	<i>Women</i>	.896	35	.003

The Shapiro-Wilk test shows that the scores of the two groups on the four scales are not all normally distributed (see Table 4). Therefore a non parametric test is used to analyze whether there are differences in the GMB results according to men and women. The Mann-Whitney test shows that men and women significantly differ on their evaluation of commitment as a result of the GMB intervention ($U = 162.50$; $Z = -2.14$; $p = .032$). According to the women that participated the intervention contributed stronger to commitment ($Mdn = 2.00$) than according to the men that participated ($Mdn = 2.25$). For the other effects of communication, learning and consensus no differences were found between men and women. Finally, no interaction effects were found between gender and power distance.

Table 5. Median scores of GMB effects for men and women

Scale	Gender	N	Median	Z-score
<i>Communication</i>	<i>Men</i>	15	2.00	-1.10
	<i>Women</i>	35	2.00	
<i>Learning</i>	<i>Men</i>	15	2.00	-1.75
	<i>Women</i>	35	1.80	
<i>Consensus</i>	<i>Men</i>	15	2.00	-1.01
	<i>Women</i>	35	1.75	
<i>Commitment</i>	<i>Men</i>	15	2.25	-2.14*
	<i>Women</i>	35	2.00	

* $p = .032$

Conclusion and discussion

The intervention method GMB aims to enlarge open communication between participants and their learning about a specific complex problem, and to create consensus about the problem and commitment to the outcomes. Because of the strong participatory character of the method, we expected that the effects of the intervention would be experienced differently for participants in countries characterized by varying degrees of power distances. More specifically we expected participants from countries with a high power distance (Belgium, France and Turkey) to indicate a smaller contributions of the intervention than for participants in countries characterized by a low power distance (the Netherlands and Germany). Therefore we examined whether there are differences in the results of GMB that participants report in countries with low, middle and high power distance. For one of the four GMB outcomes, commitment, differences were found between the different power distance groups. Participants in countries characterized by high power distance indicate the GMB intervention contributed strongest to commitment, more than as indicated by the participants from low power distance countries and even more than those from middle power distance countries. Related to communication, learning and consensus no differences were found between the three groups in terms of their evaluation of the effects of GMB. It appears that in countries in which participants are less familiar with participatory methods, participants to GMB perceive this intervention method as

effective, and judge the method to contribute to the same extent to creating communication, learning and consensus. The fact that we did not find these differences indicates that the method is not restricted to countries with small power distances, and to participants that are familiar with participatory methods.

However, there also was a difference between the evaluation of commitment as intervention result comparing men and women. Women more strongly than men, indicated that the intervention contributed to commitment to the results. An explanation of this gender difference in the evaluation of effectiveness, might be that women are more strongly involved in the specific subject of the interventions in the seven cases, i.e. gender equality in science. In all cases women were underrepresented in higher academic and management positions. Extended research is needed to gain more insight in possible gender differences in the evaluation of the results of GMB, for instance through international comparative research into interventions with a more gender neutral subject.

In this study, the focus is on the perception of the participants. How effective is GMB in contributing to communication, learning, consensus and commitment, according to the participants? This study shows that, according to the participants, the intervention effectively increased communication, insight, consensus and commitment. Participants in countries with a high power distance perceived the intervention as effective to the same degree as participants in countries with a low power distance, although they were more positive about the contribution to commitment. However, previous research shows that participants have difficulty evaluating what they have learned (Rouwette, Korzilius, Vennix, & Jacobs, 2011). Extended research, for instance into the extent to which the outcomes of GMB interventions percolate into the organization, is necessary to find out whether the method has differential effects in organizations stationed in countries that differ on the cultural dimension of power distance. A final suggestion for further research is to take into account the role of relative power differences between the group of participants, articulated in their material power positions within the organization. In this study, we specifically looked at power distance as a national cultural dimension of the entire group of participants. What does GMB do in groups with little power distance between participants compared to groups with participants that differ substantially in power distance?

References

- Akkermans, H. & Vennix, J.A.M. (1997). Clients' opinions on group model building: an exploratory study. *System Dynamics Review* 13(1), 3-31.
- Andersen, D. & Richardson, G. (1997) Scripts for model building. *System Dynamics Review*, 13 (2), 107-129.
- Andersen, Richardson & Vennix, J.A.M. (1997) Group model building: adding more science to the craft. *System Dynamics Review*, 13 (2), 187-203
- Fokkinga, B., Bleijenbergh, I. & Vennix, J.A.M. (2009) Group model building evaluation in single cases: a method to assess changes in mental models. In: *Proceedings of the International System Dynamics Conference 2009*, Albany: System Dynamics Society
- Hofstede, Geert (1991). *Cultures and organizations*. London: McGraw-Hill.
- Hofstede, G., Hofstede, G.J., & Minkov, M. (2010). *Cultures and Organizations: Software for the Mind* (3rd Edition). New York, NY, USA: McGraw-Hill Professional Publishing. ProQuest ebrary. Web. 4 January 2016.

- McCardle-Keurentjes, M., Rouwette, E., Vennix, J.A.M., Jacobs (2009) Is group model building worthwhile? Considering the effectiveness of GMB. In: *Proceedings of the International System Dynamics Conference 2009*, Albany: System Dynamics Society
- Newman, K., & Nollen, S. (1996). Culture and congruence: the fit between management practices and national culture. *Journal of International Business Studies*, 27(4), 753-779.
- Rouwette, E., Bleijenbergh, I. & Vennix, J. (2015) Group Model Building to Support Public Policy: Addressing A Conflicted Situation in a Problem Neighbourhood. *Systems Research and Behavioural Science*, 33, 64-78.
- Rouwette, E.J.A.J. (2011). *Facilitated modelling in strategy development: measuring the impact on communication, consensus and commitment*. Journal of the Operational Research Society, 62, 879-887.
- Rouwette, E.J.A.J., Korzilius, H., Vennix, J.A.M., & Jacobs, E. (2011). Modeling as persuasion: the impact of group model building on attitudes and behavior. *System Dynamics Review*, 27(1), 1-21.
- Scott, R., Cavana, R. & Cameron, D. (2016). *Recent evidence on the effectiveness of group model building*. *European Journal of Operational Research*, 249(3), 908-918.
- Scott, R., Cavana, R. & Cameron, D. (2014) Mechanisms for understanding mental model change in group model building. *Systems Research and Behavioural Science*
- Vennix, J. A.M. (1996) *Group model building: facilitated Team Learning Using System Dynamics*. Wiley: Chichester.
- Vennix, J., Scheper, W., & Willems, R. (1993). Group model building. What does the client think of it? In: Zepeda E. and Machuca JAD (eds.) *Proceedings of the 1993 International System Dynamics Conference*. System Dynamics Society: Albany, NY, pp 534-543.
- Vennix, J. & Rouwette, E. (2000). *Group model building. What does the client think of it now?* Paper presented at the International System Dynamics Conference, Bergen, Norway.